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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/718,607	11/24/2003	Hideaki Yoshida	60188-719	1705
7590 09/09/2005			EXAMINER	
Jack Q. Lever, Jr. McDERMOTT, WILL & EMERY 600 Thirteenth Street, N.W. Washington, DC 20005-3096			TRINH, MICHAEL MANH	
			ART UNIT	PAPER NUMBER
			2822	

DATE MAILED: 09/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/718,607

Applicant(s)

YOSHIDA, HIDEAKI

Examiner

Michael Trinh

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 10 January 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) 8-10 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 11-24-03.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_.

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## DETAILED ACTION

\*\*\* This office action is in response to Applicant's election filed June 24, 2005. Claims 1-10 are pending, in which claims 8-10 are non-elected, without traverse.

### *Election/Restrictions*

1. Claims 8-10 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made, and as treated, without traverse in Paper date June 24, 2005.

### *Abstract Objection*

2. The abstract is objected for mentioning "3 $\mu$ m to 5 $\mu$ m inclusive", but the specification is differently described and supported for "6 $\mu$ m to 8 $\mu$ m inclusive" (see at least page 16, lines 11-17 and claim 1). Appropriate correction is required.

### *Claim Rejections - 35 USC § 102*

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

- (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
- (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
- (c) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

4. Claims 6-7 are rejected under 35 U.S.C. 102(a)/(e) as being anticipated by Homma et al (6,561,875).

Homma teaches a chemical mechanical polishing method using a chemical mechanical polishing apparatus comprising a polishing table 10 (Figs 1a-1b; col 7, line 65 through col 8) including a rotation mechanism, a polishing pad 11 attached on the polishing table, a substrate carrier 12 for holding a member to be polished, said substrate carrier including a rotation mechanism and a pressurization mechanism, and a dresser 16 including a rotation mechanism

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and a pressurization mechanism, said method comprising the steps of: (a) bringing the dresser 16 into contact with the polishing pad 11 by initially applying a dressing pressure of  $30 \text{ g/cm}^2$ , wherein the pressure is also to  $20 \text{ g/cm}^2$  inclusive to the dresser to dress the polishing pad 11; and (b) polishing a film 224 using the polishing pad 11 in a pattern formation substrate 200 including a substrate region in the top of which a trench is formed and the film 224 with which the trench is filled in (Fig 2; col 8, line 47 through col 9). Re claim 7, wherein in the step (a), initially applying a dressing pressure of  $30 \text{ g/cm}^2$  to the dresser, which pressure is within the claimed dressing pressure of  $30 \text{ g/cm}^2$  to  $34 \text{ g/cm}^2$  inclusive.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1,4,5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohashi et al (6,376,345) taken with James (6,454,634) and Pierce (WO 00/30159).

Ohashi teaches chemical mechanical polishing method using a chemical mechanical polishing apparatus (Figs 9,5-6, cols 11-14) comprising a polishing table 104 including a rotation mechanism 102/103, a polishing pad 105 attached on the polishing table, a substrate carrier 106 for holding a member to be polished, said substrate carrier 106 including a rotation mechanism 107 and a pressurization mechanism, and a dresser 109 including a rotation mechanism and a pressurization mechanism (Fig 9; col 12, line 20 through col 13), said method comprising the

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steps of: (a) dressing the polishing pad 105 with the dresser 109 coming in contact with the polishing pad 105 (col 12, line 59 through col 13); and (b) polishing a film 27 using the polishing pad 105 having a surface roughness of in a pattern formation substrate including a substrate region in the top of which a trench 24-26 is formed and the film with which the trench is filled in (Figs 5-6; col 11, line 36 through col 13, line 20). Re claim 4, wherein the film includes a copper film (Cu) 27 and a barrier metal (col 11, line 58 through col 12; col 15, lines 59-65; Fig 6), and in the step (b), the copper film and the barrier metal are polished to form a buried copper interconnect in the top of the substrate region (Fig 6). Re claim 5, wherein the step (a) and the step (b) are carried out simultaneously (col 12, lines 59-67)

Ohashi lacks mentioning the use of polishing pad having a surface roughness of  $6\mu\text{m}$  to  $8\mu\text{m}$  inclusive.

However, James teaches (at col 2, lines 6-30) using of a polishing pad having a surface roughness of about 1 to about  $9\mu\text{m}$  (col 2, lines 11-12), wherein in one embodiment roughness of polishing pad can be up to 7 microns (col 2, lines 23). Pierce also teaches (at page 5, lines 10-20) to employ a polishing pad having an average roughness of less than 6 microns, and a root mean square roughness of less than 7 microns.

Therefore, the subject matter as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made to select the portion of the prior art's range of roughness of polishing pad of about 1 to about  $9\mu\text{m}$ , or be up to 7 microns, as taught by James, and the teaching of Pierce for employing a polishing pad having an average roughness of less than 6 microns, and a root mean square roughness of less than 7 microns, which is within the range of applicant's claims, because of the desirability to polish a substrate to form a planar surface, wherein it has been held to be obvious to select a value in a known range by optimization for the best results, and would be an unpatentable modification, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation". *In Re Aller* 104 USPQ 233,255 (CCPA 1955); *In re Waite* 77 USPQ 586 (CCPA 1948); *In Re Swanson* 56 USPQ 372 (CCPA 1942); *In Re Sola* 25 USPQ 433 (CCPA 1935); and *In Re Dreyfus* 24 USPQ 52 (CCPA 1934).

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7. Claims 2-3,6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohashi et al (6,376,345) taken with James (6,454,634) and Pierce (WO 00/30159), as applied to claims 1,4,5 above, and further of Homma et al (6,561,875) or Kubo (6,132,292).

Ohashi teaches chemical mechanical polishing method using a chemical mechanical polishing apparatus as applied to claims 1,4-5 above.

Re claims 2-3,6-7, Ohashi lacks teaching a dressing pressure of 18 to 40 g/cm<sup>2</sup> inclusive, as recited in claims 2,6, wherein a dressing pressure is 24 to 34 g/cm<sup>2</sup> inclusive as recited in claims 3 and 7.

However, Homma teaches (at Figs 1a-1b; col 7, line 65 through col 8) bringing the dresser 16 into contact with the polishing pad 11 by initially applying a dressing pressure of 30 g/cm<sup>2</sup>, wherein the pressure is also to 20 g/cm<sup>2</sup> inclusive to the dresser to dress the polishing pad 11; and (b) polishing a film 224 using the polishing pad 11 in a pattern formation substrate 200 including a substrate region in the top of which a trench is formed and the film 224 with which the trench is filled in (Fig 2; col 8, line 47 through col 9), wherein the dressing pressure of 30 g/cm<sup>2</sup> to the dresser (col 13, lines 10-15), which pressure is within the claimed dressing pressure of 24 g/cm<sup>2</sup> to 34 g/cm<sup>2</sup> inclusive. Kubo also teaches (at col 18, lines 5-15) dressing a polishing pad by applying a dressing pressure of about 20 gwt/cm<sup>2</sup>.

Therefore, the subject matter as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made to select the portion of the prior art's range of dressing pressure of about 30 g/cm<sup>2</sup>, as taught by Homma, and a dressing pressure of about 20 gwt/cm<sup>2</sup>, as further taught by Kubo, which is within the range of applicant's claims, because of the desirability to polish a substrate to form a planar surface, wherein it has been held to be obvious to select a value in a known range by optimization for the best results, and would be an unpatentable modification, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation". *In Re Aller* 104 USPQ 233,255 (CCPA 1955); *In-re Waite* 77 USPQ 586 (CCPA 1948); *In Re Swanson* 56 USPQ 372 (CCPA 1942); *In Re Sola* 25 USPQ 433 (CCPA 1935); and *In Re Dreyfus* 24 USPQ 52 (CCPA 1934).

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael M. Trinh whose telephone number is (571) 272-1847. The examiner can normally be reached on M-F: 8:30 Am to 5:00 Pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on (571) 272-1852. The fax phone number is (571) 273-8300.

Any inquiry of a general nature or relating to the status of this application should be directed to the receptionist whose telephone number is (703) 308-0956.

Oacs-17

A handwritten signature in black ink, appearing to read 'Michael Trinh', is positioned above the printed name and title.

Michael Trinh  
Primary Examiner